

Report No. WM-F1-83-024

Date: September 1983

INTERNAL TECHNICAL REPORT

Title:

RADIOLOGICAL CHARACTERIZATION AND DECISION ANALYSIS

FOR THE CPP-603 FUEL-ELEMENT CUTTING FACILITY

Organization: Waste Management Programs Division

Author: D. L. Smith and D. A. Schmidt

Checked By: RHMeservey

Approved By Rysiers

THIS DOCUMENT HAS NOT RECEIVED PATENT CLEARANCE AND IS NOT TO BE TRANSMITTED TO THE PUBLIC DOMAIN

EG&G Idaho, Inc.

9-28-83 Date

ENICO

heeler, Vice President, Production Department

Offult, Manager, Facilities Management

Scott, Manager, Special Services

Nechodom, Quality Assurance, Safety, and Security

9/28/83 Date 9/28/83 Date

9/28/83 Date

9 /21/83 Date

CONTENTS

1.	INTRODUCTION AND OBJECTIVES	1
2.	HISTORY AND BACKGROUND	2
3.	FACILITY DESCRIPTION	6
4.	CHARACTERIZATION PERFORMED	30
	4.1 Methodology	30
	4.2 Characterization Results	30
	4.2.1 FECF Hot Cell	30 34
5.	POTENTIAL PROBLEM AREAS	40
6.	DECISION ANALYSIS	41
	6.2 Alternative Decommissioning Modes 6.3 Facilities and Materials Reuse 6.4 Approximate Cost and Schedule for Each Alternative 6.5 Estimated Volumes of Waste Generated for Each Alternative 6.6 Hazards to D&D Workers 6.7 Short-Term Impacts on Other INEL Personnel and Organizations 6.8 Long-Term Impacts on the Public 6.9 Advantages and Disadvantages of Each Alternative 6.10 Cost-Benefit Summary 6.11 Recommendation	41 41 42 43 43 43 48 48 48
7.		52
8.		54
9.	DRAWING LIST	55
	FIGURES	
1.	Cutaway of CPP-603, south side, showing the FECF	4
2.	Plot plan of ICPP	5
3.	Isometric cutaway of the FECF from the north side	8

4.	Horizontal section of the FECF, 3 ft, 9 in. above the hot cell floor looking down	9
5.	Vertical section of the FECF through the slot region looking west	10
6.	The FECF hot cell, looking northwest	11
7.	Inside CPP-603, looking east	12
8.	South side of the FECF hot cell	13
9.	Closeup of south side of FECF hot cell near west end	14
10.	West end of FECF hot cell	15
11.	North side of FECF hot cell, looking east	16
12.	FECF hot cell, with west hatch cover removed and looking south	17
13.	Interior of FECF hot cell, looking east through the west hatch	18
14.	West end of FECF hot cell interior, looking north	19
15.	West end of FECF hot cell interior, looking south	20
16.	East end of FECF hot cell interior, looking north	21
17.	East end of FECF hot cell interior, looking south	22
18.	Receiving pit, looking west	23
19.	Receiving pit, looking east into the tunnel	24
20.	West end of FECF tunnel, looking east	25
21.	East end of FECF tunnel, looking east	26
22.	FECF tunnel, showing periscope opening for viewing the transfer of fuel from the hot cell into the charger	27
23.	FECF tunnel, looking west	28
24.	FECF tunnel, looking west, and showing a closeup view of the charger cap-handling device	29
25.	Worker taking a smear from inside the FECF hot cell	31
26	Tool used for smearing the hot cell interior	32

27.	Radiation survey of hot cell interior	33
28.	Smear numbers and locations inside the FECF hot cell	35
29.	FECF tunnel and receiving pit, showing radiation levels and location of soil sample	37
	TABLES	
1.	Radioisotopic content of smears taken from FECF hot cell interior	36
2.	Radioisotopic content of smears taken from inside FECF tunnel	38
3.	Radioisotopic concentration of soil sample taken inside FECF tunnel	39
4.	Approximate cost and schedule for each alternative	44
5.	Estimated waste volume generated	45
6.	Radiation exposure to D&D workers	46
7.	Short-term impacts on other INEL personnel and organizations	47
8.	Long-term safety impact on the public	49
9.	Advantages and disadvantages of each alternative	50
10.	Cost-benefit summary	51
11	Waste volume estimate	53

RADIOLOGICAL CHARACTERIZATION AND DECISION ANALYSIS FOR THE CPP-603 FUEL-ELEMENT CUTTING FACILITY

1. INTRODUCTION AND OBJECTIVES

Exxon Nuclear Idaho Company, Inc. (ENICO), and the Waste Management Programs Division of EG&G, Idaho, Inc., have completed a physical and radiological characterization of the CPP-603 Fuel Element Cutting Facility (FECF) located at the Idaho Chemical Processing Plant (ICPP).

The objectives of this characterization are to physically describe the FECF, measure and record radiation fields inside the FECF, and determine the isotopic content of smearable contamination inside the FECF.

Additionally, a decision analysis was performed to select the best method for decommissioning the FECF.

2. HISTORY AND BACKGROUND^{1,2}

The FECF is located within CPP-603, the Fuel Receiving and Storage Facility (FRSF) (see Figure 1). The original FRSF was constructed in 1951. This early construction did not include the south basin area of the FRSF, which houses the FECF; the south basin addition, including the FECF, was constructed in 1957.

The FRSF is located near the south perimeter of the ICPP (see Figure 2). Spent fuel subassemblies are stored at the FRSF until they are reprocessed in the CPP-601 area. The FRSF contains three deep-water basins, (north basin, center basin, and south basin) as well as a dry-storage area for graphite fuel. The deep-water basins are filled with water to a depth that ensures approximately 20 ft of water over the fuel for radiation shielding.

The 1957 construction of the south basin addition, which includes the FECF, was required to receive, store, and cut aluminum-clad fuel from the test reactor program at Savannah River. The FECF was used to remotely cut the 14-ft-long fuel elements into lengths that could be accommodated in the G-cell dissolver in CPP-601.

The fuel-cutting operation in the FECF began in 1959 and continued until all the aluminum-clad, 14-ft-long fuel elements were sectioned in 1962. Since 1962, the FECF has been inactive. The FECF hot cell has been used for the storage of two pieces of fuel elements from 1980 to the present.

Soon after shutdown of the FECF, the cell was decontaminated. In 1965, the general radiation field in the cell was approximately 20 mR/h. 1 After the fuel element pieces were placed in the cell in 1980, the radiation field increased to 300 R/h (α).

Since 1965, several equipment items have been removed from the FECF to improve the appearance of the cell interior and to provide spare parts for similar equipment in other areas of ICPP.

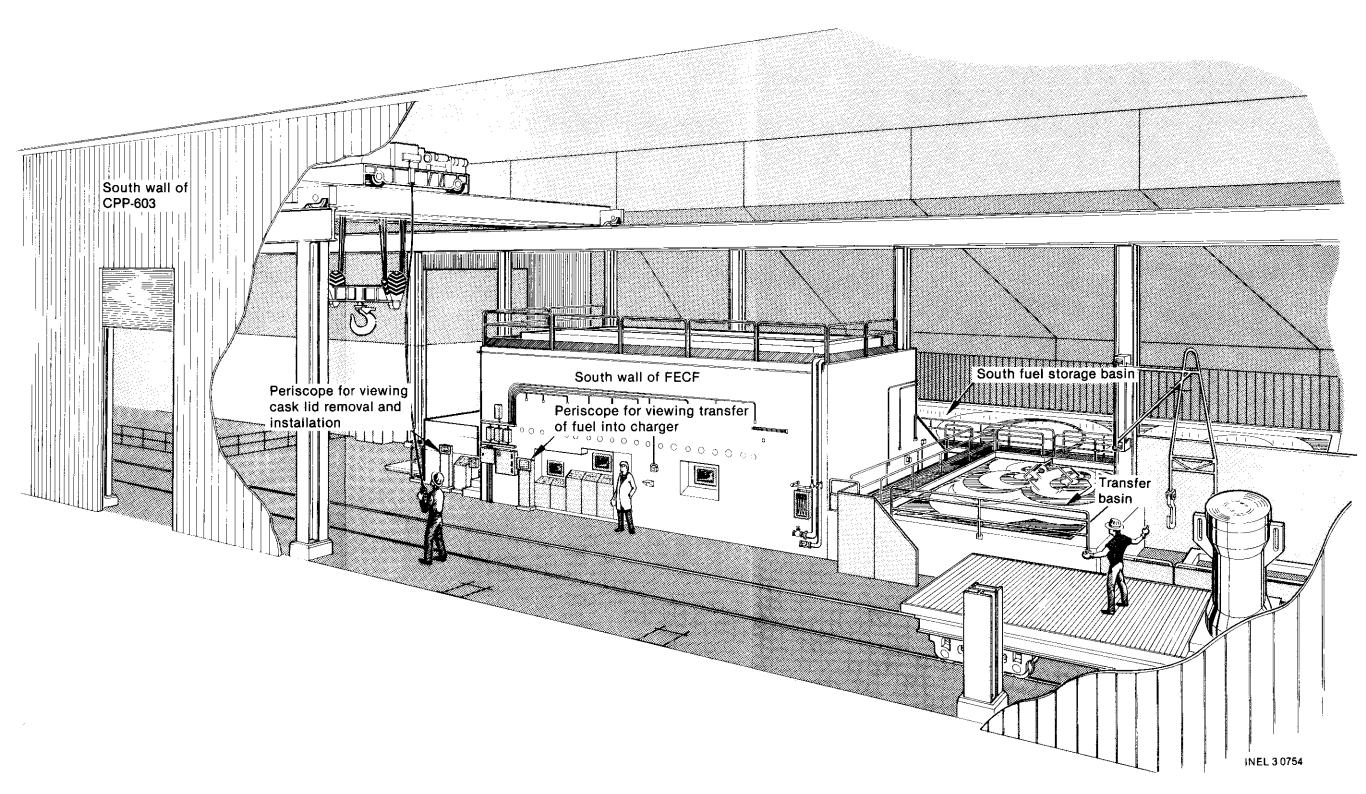


Figure 1. Cutaway of CPP-603, south side, showing the FECF.

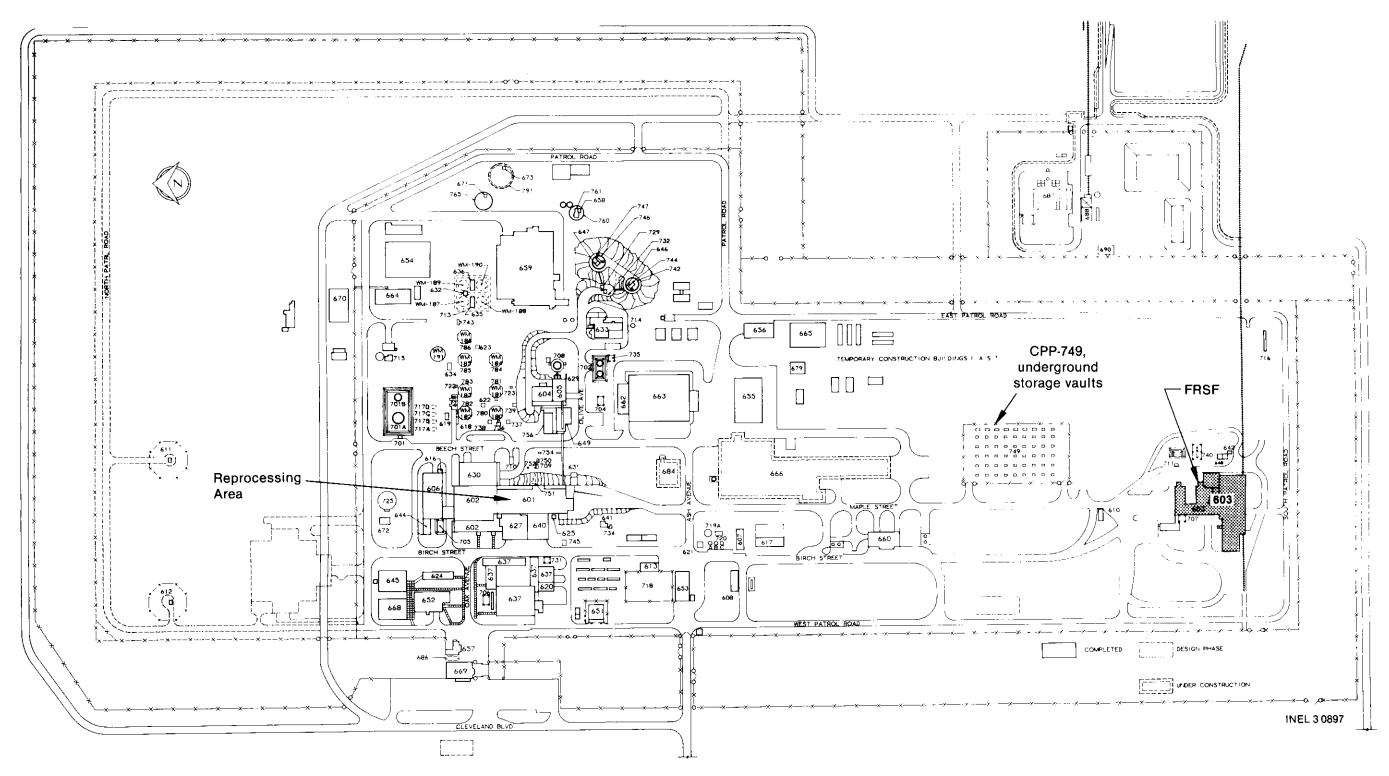


Figure 2. Plot plan of ICPP.

FACILITY DESCRIPTION

The FECF is located on the south side and adjacent to the south fuel storage basin in CPP-603 (see Figure 1). Figure 3 shows an isometric cutaway view of the FECF. The FECF consists of the hot cell, the tunnel beneath the hot cell, and the receiving pit.

The fuel rods entered the FECF hot cell via the conveyor. Inside the hot cell, the fuel rods were sheared into slugs, which were discharged into a two-section bucket mounted on a turntable. Each section of the bucket was filled separately. After both sections were filled, the bucket was removed by the bucket-handling device and lowered through a hole in the cell floor. The bucket with fuel slugs was then loaded into a charger mounted on a dolly located in the tunnel. The dolly then traveled west in the tunnel and stopped beneath the charger cap-handling device. This device lowered the charger cap onto the charger. The dolly then moved into the receiving pit where the charger was hoisted onto the main floor and transported to the fuel-reprocessing building.

The FECF hot cell is a concrete structure approximately 20 ft x 41 ft at the ceiling, and approximately 17 ft high. The cell contains a conveyor, which operates in a slot in the north wall to transfer fuel rods from the south fuel storage basin into the cell. Because this slot slopes away from the cell interior, the cell is L-shaped near the floor, as shown in Figure 4. The dimensions of the concrete wall are included in Figure 4. Figure 5 shows a vertical section of the FECF through the slot region looking west. The open storage area beneath the hot cell, shown in Figure 5, is not included in this characterization report. This open area can be accessed only through the door at the east end of the FECF tunnel. During characerization of the tunnel, access to this area was not attempted because of the high radiation field at the east end of the tunnel (8R/h) and the hazard of falling associated with entering the area. The floor of the tunnel is approximately 8 ft from the floor of the open storage area, and no steps are provided (see Figure 5). Personnel who operated the FECF

report that nothing is stored in this open area. ^{1,2} The radiation field and radioactive contamination inside this open area are expected to be much less than that in the FECF tunnel. The exact contamination condition will be determined after the tunnel is decontaminated. Then appropriate decontamination of the open storage area will be undertaken.

Figures 6 through 11 show the exterior of the FECF; Figures 12 through 17 show the interior of the FECF hot cell; Figures 18 through 24 show the tunnel and receiving pit.

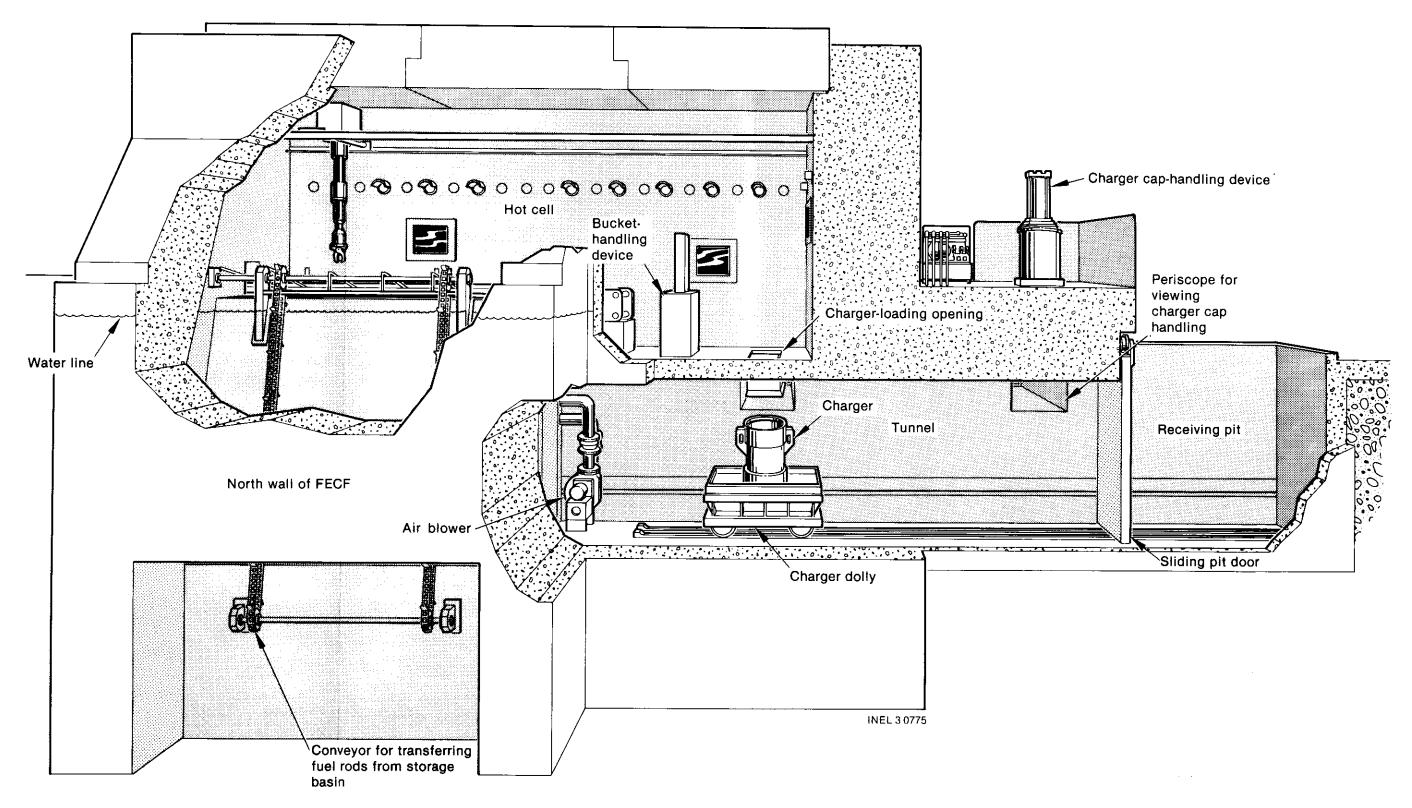


Figure 3. Isometric cutaway of the FECF from the north side looking south.

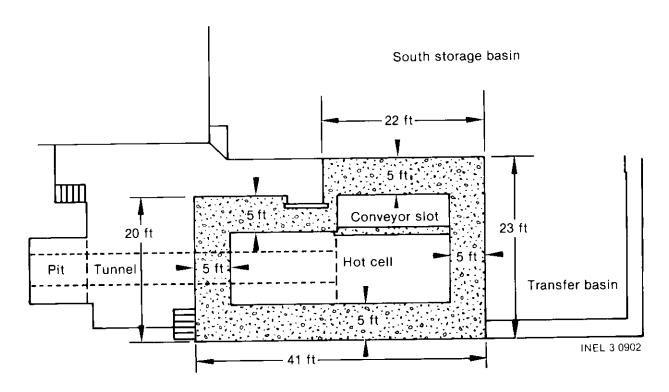
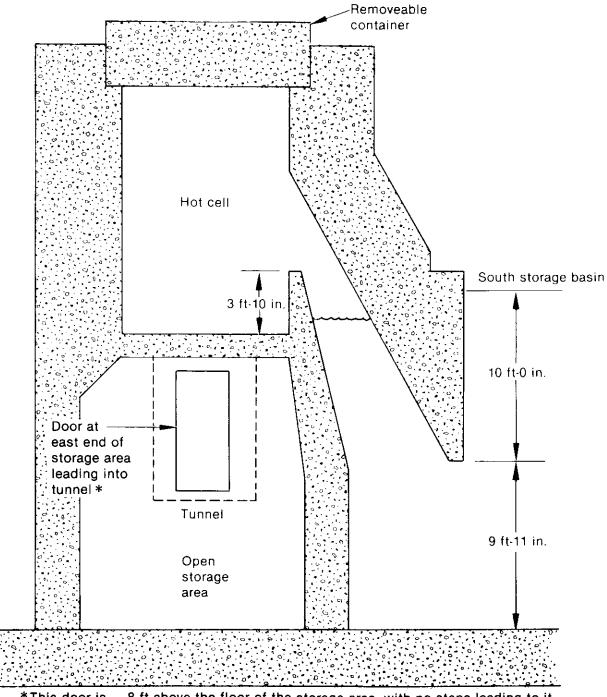


Figure 4. Horizontal section of the FECF, 3-ft, 9-in. above the hot cell floor looking down.



*This door is ~ 8 ft above the floor of the storage area, with no steps leading to it.

INEL 3 1016

Figure 5. Vertical section of the FECF through the slot region looking west.

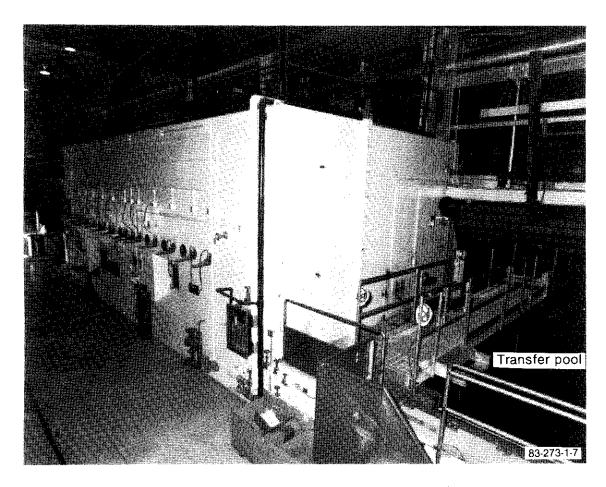


Figure 6. The FECF hot cell, looking northwest.



Figure 7. Inside CPP-603, looking east.

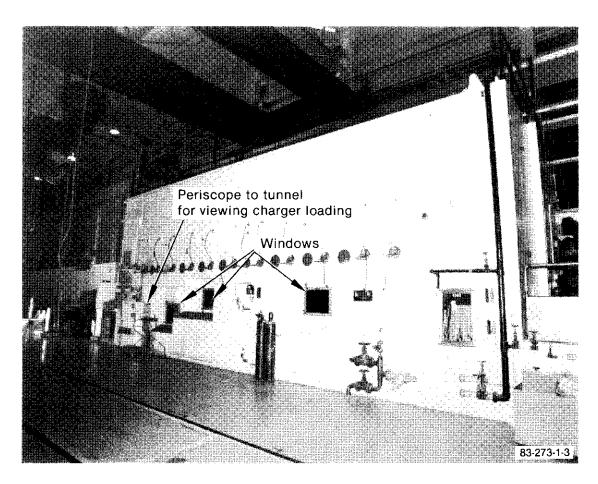


Figure 8. South side of the FECF hot cell.

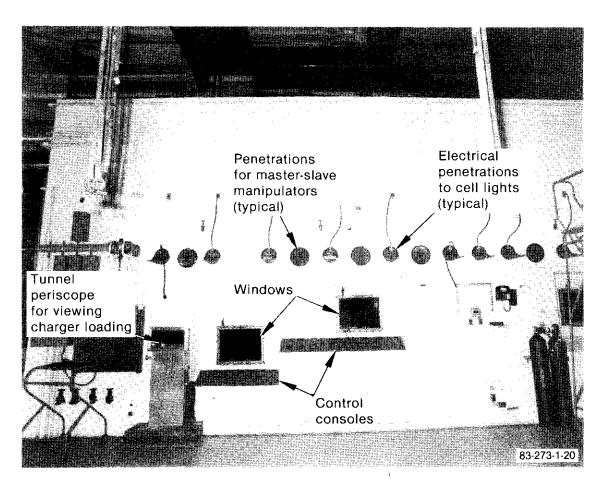


Figure 9. Closeup of south side of FECF hot cell near west end.

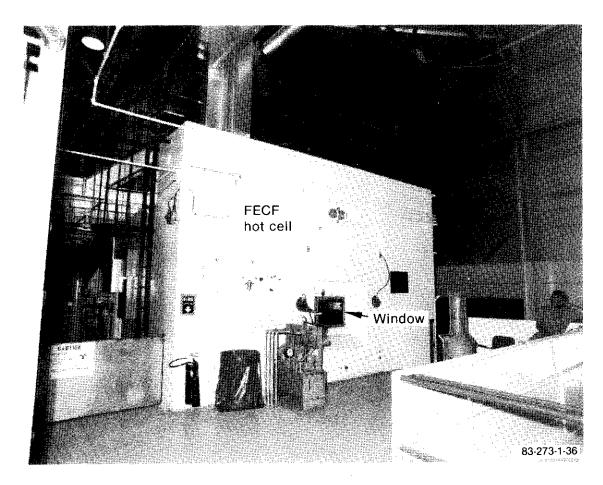


Figure 10. West end of FECF hot cell.

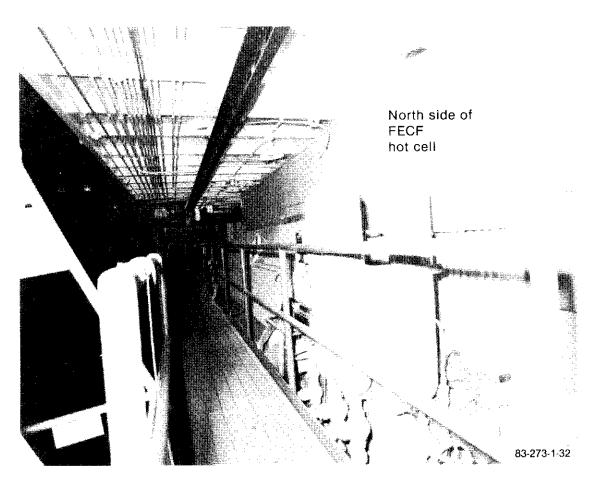


Figure 11. North side of FECF hot cell, looking east.

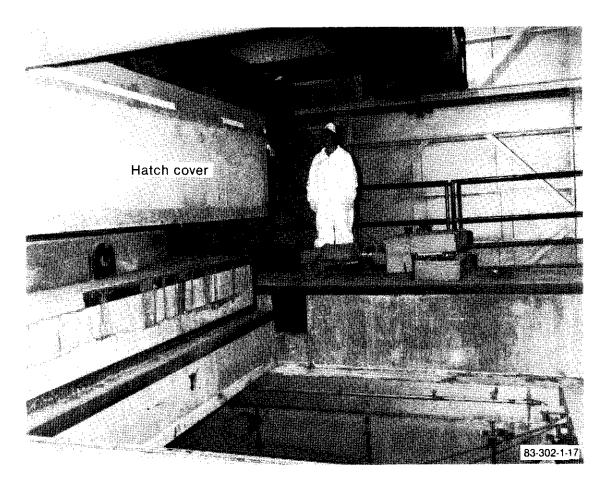


Figure 12. FECF hot cell, with west hatch cover removed and looking south.

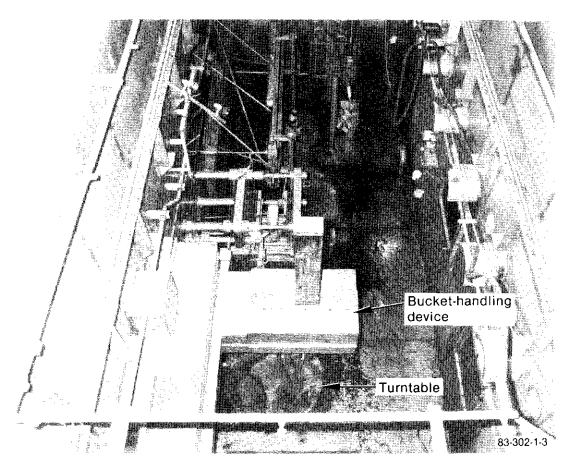


Figure 13. Interior of FECF hot cell, looking east through the west hatch.

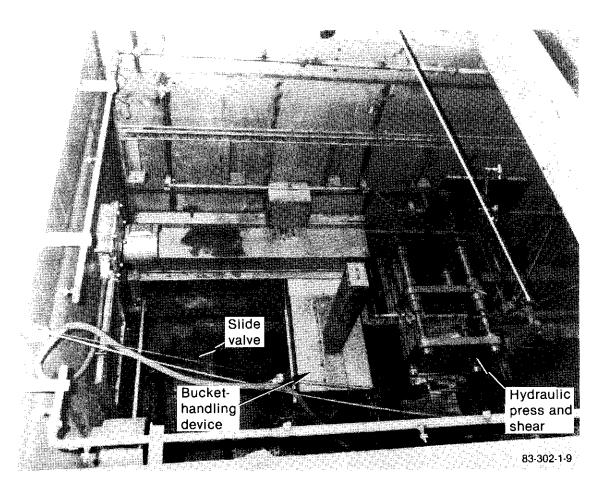


Figure 14. West end of FECF hot cell interior, looking north.

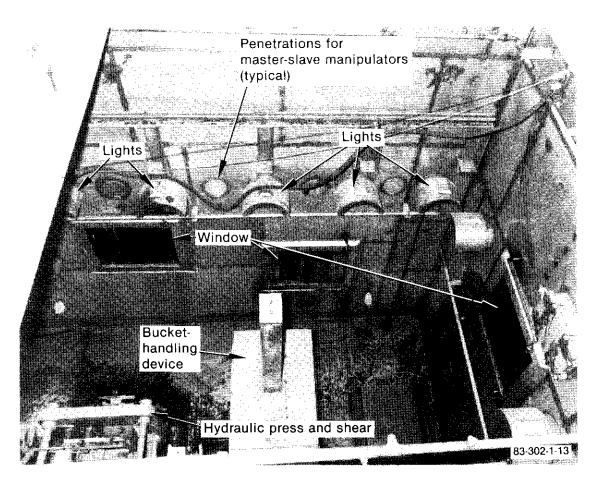


Figure 15. West end of FECF hot cell interior, looking south.

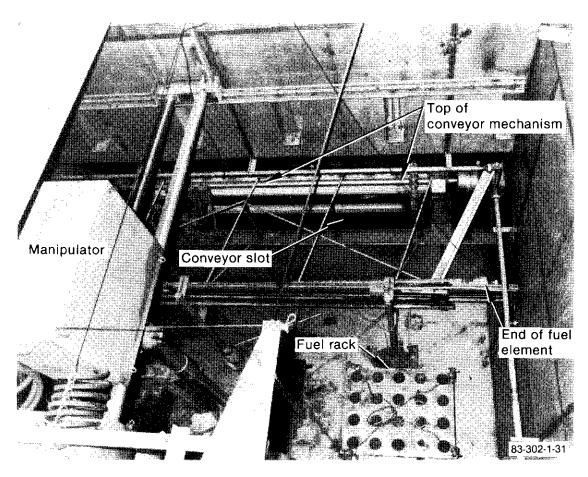


Figure 16. East end of FECF hot cell interior, looking north.

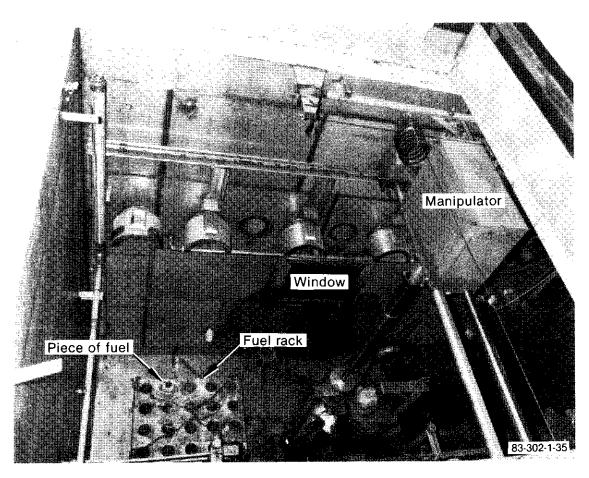


Figure 17. East end of FECF hot cell interior, looking south.

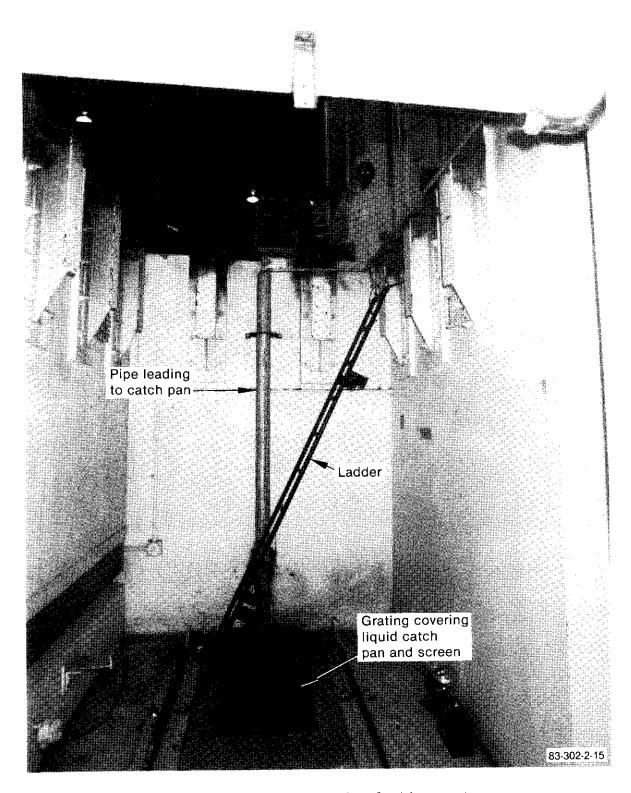


Figure 18. Receiving pit, looking west.

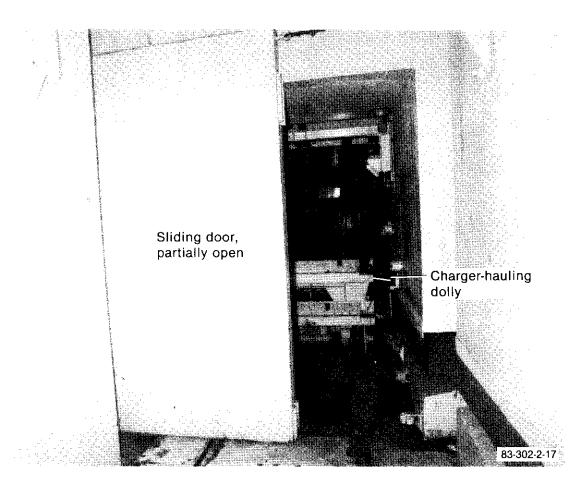


Figure 19. Receiving pit, looking east into the tunnel.

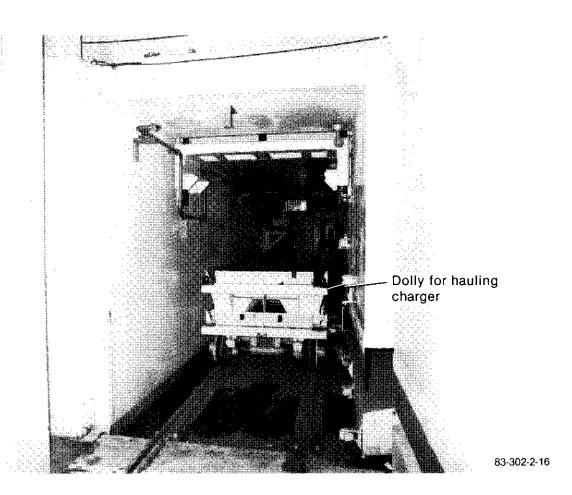


Figure 20. West end of FECF tunnel, looking east.

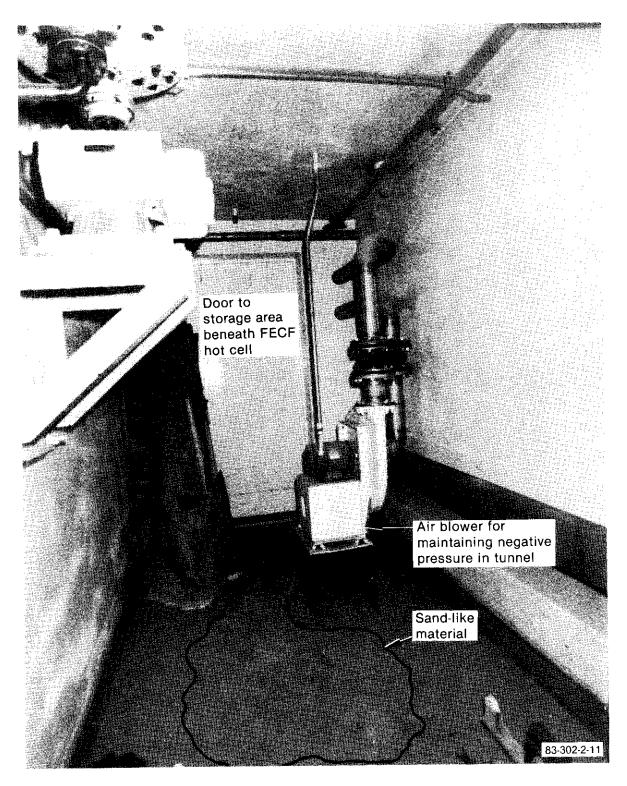


Figure 21. East end of FECF tunnel, looking east.

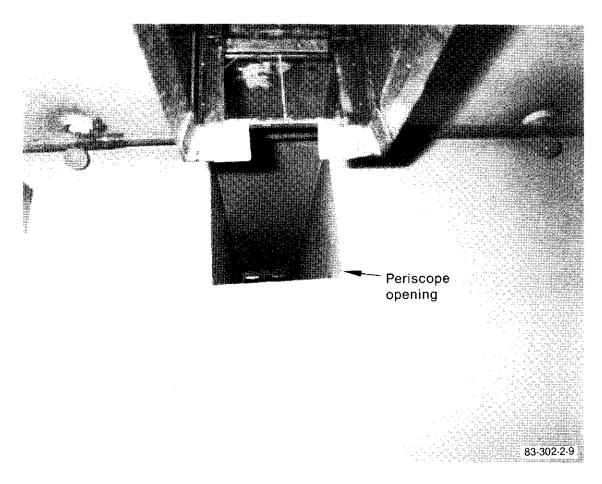


Figure 22. FECF tunnel, showing periscope opening for viewing the transfer of fuel from the hot cell into the charger.

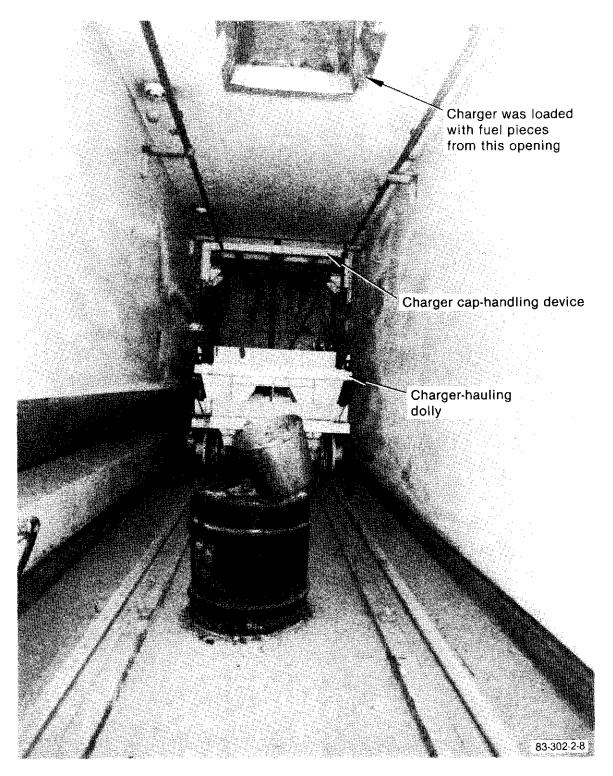


Figure 23. FECF tunnel, looking west.

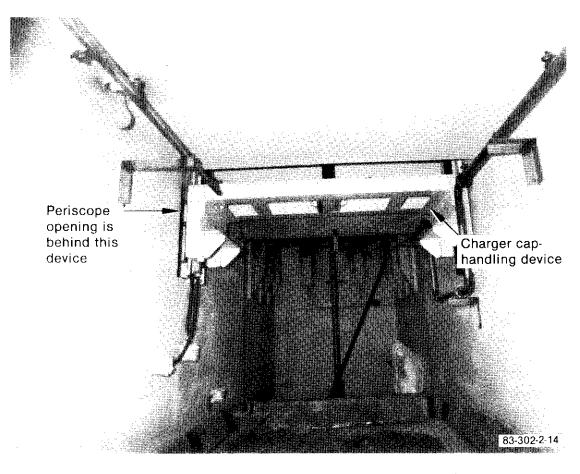


Figure 24. FECF tunnel, looking west and showing a closeup view of the charger cap-handling device.

4. CHARACTERIZATION PERFORMED

4.1 Methodology

Because of the high radiation fields associated with the two pieces of fuel elements that are stored in the FECF hot cell, personnel were not able to enter the hot cell to measure radiation fields and take debris samples. ENICO personnel performed radiation and contamination surveys using instruments and tools inserted through hatch openings on the cell roof. Figure 25 shows a worker taking a smear.

The contact radiation of the fuel element in the hot cell was measured with a Teletector. Other radiation measurements in the hot cell were obtained with a high-range Juno ion chamber suspended on a rope. The contamination surveys inside the hot cell were performed by taking smears with the tool shown in Figure 26. With this tool, two smear samples could be taken before removing and replacing the rubber stoppers. After two smears had been taken, the rubber stoppers were removed, labeled, placed in a plastic bag; two more stoppers with filter paper were then installed on the tool.

Personnel were able to enter the receiving pit and tunnel to measure radiation and take smear samples. Also, one soil sample was taken in the tunnel.

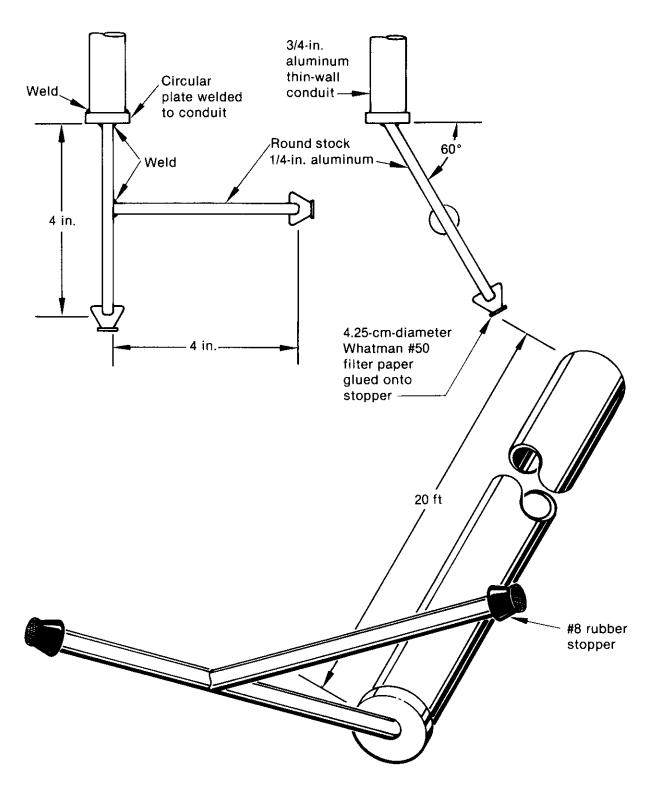
4.2 Characterization Results

4.2.1 FECF Hot Cell

The radiation field measurements are given in Figure 27. The high fields produced by the fuel elements contributed to the other readings within the hot cell, but no attempt was made to determine the magnitude of



Figure 25. Worker taking a smear from inside the FECF hot cell.



Note: Stopper is bored out half its thickness from the large-diameter end.

INEL 3 0898

Figure 26. Tool used for smearing the hot cell interior.

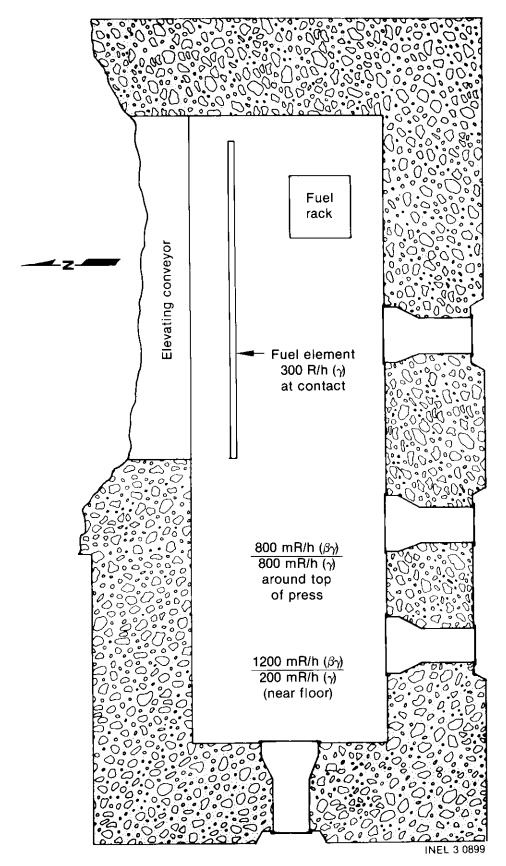


Figure 27. Radiation survey of hot cell interior.

that contribution. As stated previously, the general radiation field inside the hot cell before the fuel elements were stored was approximately 20 mR/h (B + α). However, some very hot (α 1 R/h) dust specks may be present in the cell from previous fuel-cutting operations.

Figure 28 identifies the locations of smears taken inside the FECF hot cell. The smears were radioisotopically analyzed; the results of that analysis are listed in Table 1.

4.2.2 FECF Tunnel

The radiation fields in the tunnel were measured 1 m above the tunnel floor and were recorded at two locations. Figure 29 shows the locations and radiation levels. The radiation levels in the tunnel are generally much higher than the radiation fields in the hot cell, if the contribution of the fuel element pieces in the hot cell is ignored. The high radiation levels in the tunnel are caused by contamination on the floor of the tunnel, especially near the east end where the floor is covered with sand-like material (see Figure 21). Three smears were taken from the tunnel walls. The exact locations were not recorded because of the short stay-time dictated by the high radiation field. The results of analysis of these smears are in Table 2. A soil sample was taken from the tunnel floor for radioisotopic analysis; the results of that analysis are given in Table 3.

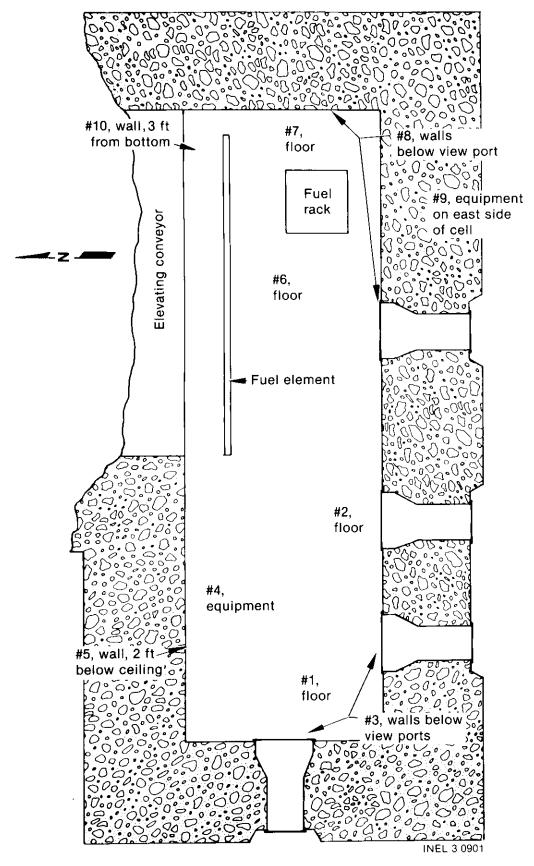


Figure 28. Smear numbers and locations inside FECF hot cell.

TABLE 1. RADIOISOTOPIC CONTENT OF SMEARS TAKEN FROM FECF HOT CELL INTERIOR (pCi/smear, except U, in mg/smear)

					Gamma	a Spectrosco	ру	~~~	· · · · · · · · · · · · · · · · · · ·	······································	·			
Identification Number	144 _{Ce}	60 _{Co}	137 _{Cs}	152 _{Eu}	154 _{Eu}	⁴⁰ K	54 _{Mn}	95 _{Nb}	106 _{Ru}	125 _{Sb}	95 <u>Zr</u>	90 _{Sr}	(mg/smear)	Gross Alpha
1	b	2.5×10^{2}	1.4×10^4	b	b	b	b	b	b	b	b	c	C	c
2	b	2.1 x 10 ²	1.6×10^4	b	b	_ _ b	b	b	b	b	b	c	c	C
3	3.6×10^{2}	8.4×10^{1}	1.2 x 10^3	b	b	b	2.6 x 10 [†]	4.2×10^{1}	1.2×10^{2}	1.3×10^{2}	4.9×10^{1}	c	c	c
4	b	2.8×10^{3}	2.4×10^4	b	b	3.1×10^{2}	b	b	b	b	b	c	c	c
5	b	7.2×10^2	1.3×10^4	b	b	b	b	b	b	b	b	c	c	c
6	b	5.4×10^{2}	2.8×10^{4}	b	b	b	p	b	b	b	b	c	c	c
7	b	3.4×10^3	2.2×10^4	4.2×10^{2}	3.7×10^2	b	_ _ b	b	b	2.2×10^{2}	b	c	c	c
8	b	3.8×10^{1}	9.6 x 10 ²	- - b	b	3.0×10^{2}	h	b	b	b	b	C	c	C
9	b	1.8×10^3	5.1 x 10 ⁴	b	1.4×10^{2}	b	b	b	b	b	b	1.0×10^4	<0.03	1.8×10^{2}
10	b	9.3 x 10 ¹	2.0×10^3	_ _ b	b	b	b	<u></u> b	b	b	b	c	c	c

a. Figure 28 shows location of each smear.

b. Isotope was below detection limit.

c. Analysis was not performed.

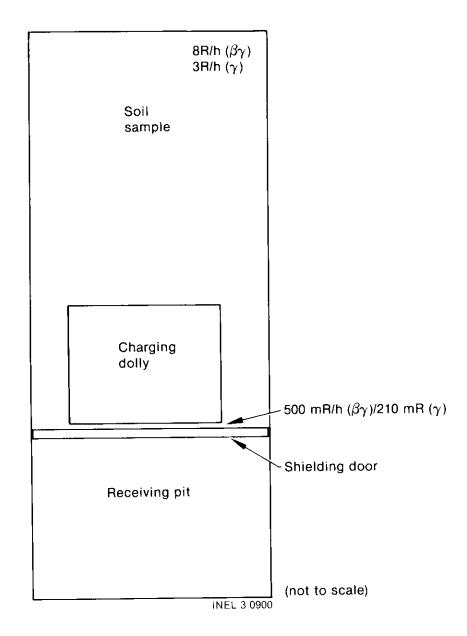


Figure 29. FECF tunnel and receiving pit, showing radiation levels and location of soil sample.

TABLE 2. RADIOISOTOPIC CONTENT OF SMEARS TAKEN FROM INSIDE FECF TUNNEL (pCi/smear, except U, in mg/smear)

				Gar	nma Spectrose	сору						
Identification Number	144 _{Ce}	60 _{Co}	134 _{Cs}	137 _{Cs}	152 _{Eu}	154 _{Eu}	155 _{Eu}	40 _K	125 _{Sb}	⁹⁰ Sr	U <u>(mg/smear)</u>	Gross Alpha
1	6.3×10^3	1.8×10^{3}	1.4×10^3	1.8 x 10 ⁵	2.9 x 10 ⁴	2.5 x 10 ⁴	7.8×10^3	6.3 x 10 ²	1.4×10^3	a	a	a
2	p	2.8 x 10 ⁴	1.3 x 10 ⁴	2.3 x 10 ⁶	4.5 x 10 ⁵	3.6×10^{5}	1.2 x 10 ⁵	^b	^b	1.2 x 10 ⁶	0.518	1.4×10^2
3	^b	7.4 x 10 ¹	^b	6.1 x 10 ³	5.7 x 10 ²	5.5×10^{2}	^b	^b	- - b	a	a	^a

a. Analysis was not performed.

b. Isotope was below detection limit.

TABLE 3. RADIOISOTOPIC CONCENTRATION OF SOIL SAMPLE TAKEN INSIDE FECF TUNNEL (pCi/g except U, in mg/g)

		Gamma Spec	troscopy					
60 _{Co}	134 _{Cs}	137 _{Cs}	152 _{Eu}	154 _{Eu}	155 _{Eu}	90 _{Sr}	υ <u>(mg/g)</u>	Gross Alpha
6.0×10^4	7.3 x 10 ⁵	1.4 x 10 ⁸	2.1 x 10 ⁶	1.7 x 10 ⁶	5.9 x 10 ⁵	1.3 x 10 ⁶	0.069	2.8×10^{2}

5. POTENTIAL PROBLEM AREAS

The only known problem that will influence the decommissioning of the FECF is the presence of the two fuel element pieces in the hot cell. These pieces of fuel elements must be removed and stored at another location before decommissioning of FECF is begun. They must be placed in dry storage since they are made of graphite. Although at present no other suitable storage space is available for this fuel, adequate storage space might be available in CPP-749, underground Storage Vaults (see Figure 2), where space will be added some time between 1985 and 1987.

6. DECISION ANALYSIS

6.1 Objective

This decision analysis was performed to determine the best decommissioning alternative for the Fuel Element Cutting Facility (FECF) in CPP-603. Any alternative requiring entrance into the FECF hot cell cannot be implemented until the two pieces of fuel being stored there are removed. Because no other storage space for this fuel will be available until after 1985, the FECF cannot be decommissioned until after 1985.

6.2 Alternative Decommissioning Modes

The decommissioning alternatives considered in this decision analysis are:

- 1. Take no action—This alternative assumes that the two fuel element pieces would be removed from the FECF hot cell and stored at another location, but no decommissioning tasks would be performed.
- Limited ripout and decontamination—This alternative consists of removing loose equipment and debris from the hot cell, decontaminating the hot cell, removing loose equipment and debris from the tunnel and receiving pit, and decontaminating the tunnel and pit. In addition, the open storage area beneath the FECF hot cell would be decontaminated if required. Loose equipment is equipment that was not part of the original fuel—cutting equipment and is not secured to the FECF structure.
- 3. Total ripout and decontamination—This alternative consists of removing all equipment from the hot cell—including the elevating conveyor, manipulator, hydraulic press and shear, turntable, fuel—element feed mechanism, bucket—handling device, slide valve, and all other equipment. The hydraulic systems and components outside the hot cell walls would also be removed. Equipment

mounted in the concrete structure (e.g., hydraulic and utility feed-throughs) would be left intact if it is determined to be useful in the planned reuse of the facility. All equipment from the tunnel and receiving pit would be removed. After all equipment is removed from the FECF hot cell, tunnel, and receiving pit, these areas would be decontaminated. In addition, the open storage area beneath the FECF hot cell (see Figure 5) would be decontaminated if required.

4. Total demolition—This alternative consists of removing all equipment from the FECF hot cell, tunnel, and receiving pit.

After all equipment is removed, the contaminated surfaces of the concrete would be spalled off to a depth of 4 in. In addition, the walls of the open storage area beneath the hot cell would be spalled off if required. This should make possible burial of the remaining concrete in the sanitary landfill instead of at the RWMC. Once the contamination is removed from the concrete by spalling off the surface, the remaining uncontaminated concrete would be sawed into sections and buried in the sanitary landfill. The FECF structure would be demolished to the floor level in CPP-603.

6.3 Facilities and Materials Reuse

Probably no materials or equipment in the FECF could be reused, but determination of future usefulness of any equipment will be made when the D&D plan is written. The hot cell has potential reuses, some of which are:

- 1. Hot cell fuel examination facility
- 2. Dry fuel storage facility

3. Support facility for commercial fuel storage in CPP-603. The storage of commercial fuel in CPP-603 is a possibility; the final decision relative to the disposition of CPP-603 will not be made before 1985.

6.4 Approximate Cost and Schedule for Each Alternative

Table 4 gives estimates of the cost and duration for each alternative. Because the FECF is a concrete structure within another building, no surveillance and maintenance costs are included in this cost estimate. Also, the cost to remove the two fuel elements is not included. The estimates in Table 4 are for comparison of the alternatives; a more exact estimate will be made when the D&D plan is written.

6.5 Estimated Volumes of Waste Generated for Each Alternative

Table 5 gives the estimated radioactive and nonradioactive waste volumes generated for each alternative.

6.6 Hazards to D&D Workers

Table 6 presents the estimated radiation exposure to workers during decommissioning for each alternative. No special hazards are expected during decommissioning of the FECF. This estimate of radiation exposure assumes that the two fuel element pieces will be removed before decommissioning is begun; therefore, the exposure during removal of the fuel element pieces is not included in Table 6.

6.7 Short-Term Impacts on Other INEL Personnel and Organizations

The short-term impacts on other INEL personnel and organizations are summarized in Table 7. No impact is given for alternative 1, take no action, because the FECF is a heavy-concrete structure from which no radiation hazard exists outside the walls.

TABLE 4. APPROXIMATE COST AND SCHEDULE FOR EACH ALTERNATIVE

	Alternative	a Approximate Cost (\$000)	a Duration (months)
1.	Take no action	0	0
2.	Limited ripout and decontamination ^b	138	7
3.	Total ripout and decontamination ^b	254	9
4.	Total demolition ^b	546	17

a. The cost and duration to write the D&D plan and obtain required reviews and approvals are included in this estimate. Cost estimates are in FY 1983 dollars.

b. Cost and schedule estimates are based on assumption of minimal contamination in the open storage area beneath the FECF hot cell. Minimal contamination would allow "hands-on" decontamination.

TABLE 5. ESTIMATED WASTE VOLUME GENERATED

	Alternative		Boxed Volume of Contaminated Metal (ft ³)			Volume of Uncontaminated Concrete ^a (ft ³)	
		Stainless <u>Steel</u>	Steel	<u>Other</u>			
1.	Take no action	0	0	0	0	0	
2.	Limited ripout and decontamination	32	352	0	0	o	
3.	Total ripout and decontamination	32	1120	128	0	0	
4.	Total demolition	32	1120	128	2516 ^b	20,097	

a. Volume estimate assumes the contaminated surface of the concrete will be spalled off to a depth of 4 in, on all contaminated surfaces. The concrete remaining after spalling is considered uncontaminated.

b. This volume includes 25% void volume.

TABLE 6. RADIATION EXPOSURE TO D&D WORKERS

Alternative	Estimated Exposure (man-rem)
1. No action	0
2. Limited ripout and decontamination	10.8
3. Total ripout and decontamination	14.4
4. Total demolition	15.1

TABLE 7. SHORT-TERM IMPACTS ON OTHER INEL PERSONNEL AND ORGANIZATIONS

	Alternative	Short-Term Impact
1.	Take no action	None
2.	Limited ripout and decontamination	Large liquid waste volume generated during decontamination
3.	Total ripout and decontamination	Large liquid waste volume generated during decontamination
4.	Total demolition	Possible interference with operations in CPP-603 during concrete sawing.

6.8 Long-Term Safety Impacts on the Public

The stored fuel in the FECF hot cell will be removed and stored at another location regardless of the D&D alternative selected; therefore, the fuel is not a consideration here. The long-term safety impacts on the public are summarized in Table 8. In Table 8, the FECF is considered as an isolated facility relative to long-term safety impacts on the public. In actuality, the FECF is within ICPP, and the long-term impact to the public depends much more on other facilities at the ICPP than the FECF.

6.9 Advantages and Disadvantages of Each Alternative

The advantages and disadvantages of each alternative are listed in Table 9.

6.10 Cost-Benefit Summary

Table 10 is a summary of the costs and benefits of each alternative.

6.11 Recommendation

Alternative 3, total ripout and decontamination, is recommended for the decommissioning of the FECF. Although its cost is only about \$100K more than that for Alternative 2, limited ripout, the reuse potential is much greater. The major difference in work scope between Alternatives 2 and 3 is that in Alternative 3 the fuel-cutting equipment will be removed from the FECF hot cell. However, any hydraulic or other equipment mounted in the concrete structure would be retained if advantageous for the facility reuse.

TABLE 8. LONG-TERM SAFETY IMPACT ON THE PUBLIC

	Alternative	Long-Term Impact					
1.	Take no action	Remedial action in tunnel required if ICPP is returned to public domain					
2.	Limited ripout and decontamination	None					
3.	Total ripout and decontamination	None					
4.	Total demolition	None					

TABLE 9. ADVANTAGES AND DISADVANTAGES OF EACH ALTERNATIVE

	Alternative	Advantages	Disadvantages
1.	Take no action	No decommissioning costs. No waste to RWMC.	Future remedial action probable. No potential for facility reuse.
2.	Limited ripout and decontamination	Potential for limited facility reuse. Lowest cost of action alternatives.	Potential reuse is limited. Possibility of future remedial action.
3.	Total ripout and decontamination	Potential for many reuses of facility. No future remedial action.	Higher costs than those for alternative 2.
		The FECF could be removed from surplus list.	
4.	Total demolition	No future remedial action.	High decommissioning cost. No potential
		The FECF could be removed from surplus list.	for facility reuse.

TABLE 10. COST-BENEFIT SUMMARY

	Alternative	Cost (\$000)	Benefits			
1.	Take no action	0	None			
2.	Limited ripout and decontamination	138	Provides limited reuse of FECF.			
3.	Total ripout and decontamination	254	Provides several reuse possibilities. Provides for removal of facility from surplus list.			
4.	Total demolition	546	Provides for removal of facility from surplus list.			

7. WASTE VOLUME ESTIMATE

The estimated waste volume for the recommended decommissioning method is summarized in Table 11. The waste volume estimate in Table 11 includes all equipment and components in the FECF hot cell and the FECF tunnel.

TABLE 11. WASTE VOLUME ESTIMATE

	Components	Principal Material	Boxed ^a Volume (ft ³)	Total Boxes	Melted Volume (ft ³)
1.	Charger dolly	Stee1	128	1.0	12.5
2.	Charger cap-handling device	Steel	32	0.25	1.25
3.	Motor, pump, and associated piping in tunnel	Steel	64	0.5	1.0
4.	Shielding around piping in tunnel	Lead	64	0.5	8.0
5.	Miscellaneous debris in tunnel	Steel	128	1.0	5.0
6.	Elevating conveyor	Steel	64	0.5	1.5
7.	Fuel rack	Stainless steel	32	0.25	0.5
8.	Manipulator	Steel	64	0.5	1.75
9.	Hydraulic press and shear	Steel	128	1.0	12.0
10.	Fuel-element feed mechanism	Steel	64	0.5	2.5
11.	Bucket-handling device	Steel	64	0.5	2.0
12.	Slide valve	Steel	32	0.25	1.0
13.	Miscellaneous piping	Steel	96	0.75	2.5
14.	Electrical cables and components	Copper, rubber	64	0.5	N/A
15.	Miscellaneous debris	Steel	256	2.0	8.0
	in hot cell	Total	1280	10.0	59.5

a. Box dimensions--4 x 4 x 8 ft.

8. REFERENCES

- 1. Personal communication, W. D. Anderson, Exxon Nuclear Idaho Company, Inc., May 1983.
- 2. Personal communication, L. W. Madsen, Exxon Nuclear Idaho Company, Inc., September 1983.
- 3. Exxon Nuclear Idaho Company, Inc., Project Initiation Request PRD-83-9, March 1, 1983.

9. DRAWING LIST

The following drawings contain the structural and physical details of the ${\sf FECF}$:

Title	<u>I</u> r	ndex (Code	e Nun	mber
FECF General Arrangement	200	0603	40	279	105943
FECF Hot Cell General Mechanical Arrangement	200	0603	40	279	105930
FECF Plan	200	0603	00	279	105898
FECF Sections	200	0603	00	279	105900